2.1 Types of Data

* A variable is any characteristic that is observed for the subjects in a study.
* Have students list several examples of variables:
  1.
  2.
  3.
  
* What are some differences in the types of values you might get from these variables?

* 

\textbf{Categorical vs. Quantitative}

\begin{align*}
\text{Categorical} & \quad \downarrow \\
\text{each observation belongs to one of a set of categories} & \\
\text{Quantitative} & \quad \downarrow \\
\text{observations take on numerical values that represent different magnitudes of the variable}
\end{align*}

* \text{Zip code is numerical, but is it really quantitative?}

\begin{align*}
\text{Discrete} & \\
\text{possible values form a set of separate items} & \\
\text{ex. 1, 2, 3, } \ldots \\
\text{Continuous} & \\
\text{possible values form an interval} & \\
\text{ex. (4 ft, 7 ft)}
\end{align*}

* \text{(Ex 2.3) Categorical/Quantitative? (Ex 2.7 Continuous/Discrete?)}

\begin{align*}
\text{a. } & \text{number of pets} \\
\text{b. } & \text{county of residence} \\
\text{c. } & \text{domestic or import auto} \\
\text{d. } & \text{distance to work} \\
\text{a. } & \text{playing time of a CD} \\
\text{b. } & \text{number of courses receiving credit} \\
\text{c. } & \text{money in your pocket} \\
\text{d. } & \text{distance to class measured (exacting)}
\end{align*}
* Have students identify the types of variables listed previously.

* Why do we need to identify the type? It determines how the data is analyzed...

* First step is to summarize the data using a frequency or relative frequency table.

\[
\text{proportion of obs. in each category} = \frac{\text{freq. of category}}{\text{sum of all freq.}}
\]

(to make a proportion a percentage, x 100)

<table>
<thead>
<tr>
<th>Ex 2.8</th>
<th>No. Children</th>
<th>Frequency</th>
<th>Proportion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1216</td>
<td>0.270</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>710</td>
<td>0.158</td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1147</td>
<td>0.255</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>738</td>
<td>0.164</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>396</td>
<td>0.086</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>139</td>
<td>0.031</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>83</td>
<td>0.018</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>43</td>
<td>0.010</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>8+</td>
<td>35</td>
<td>0.009</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4497</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Example: collect data from class-eye color type?

<table>
<thead>
<tr>
<th>Color</th>
<th>Frequency</th>
<th>Proportion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2 Displaying Data with Graphs

* Categorical Data
  1. pie charts
  2. bar graphs
     - pareto charts (a bar graph ordered from highest to lowest frequency)

* Construct pie chart, bar graph & pareto chart from the eye color data.

(time permitting, put 2.10 or 2.11 on doc. camera and discuss. page 44)

Covered everything except this.